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(54) Locking mechanism for folding baby carriage

(57) The carriage has side frames comprising a front leg pivoted to a rear leg, a push rod 3a, and a connecting rod 4a pivoted at 15a, 16a to the rear leg and the push rod such that when the push rod 3a and the connecting rod 4a are locked in a co-linear state, the carriage is locked in an open position. The locking mechanism is characterised in that the pivot point 16a is positioned a predetermined distance above the lower end of the push rod 3a, whereby in the co-linear state the push rod and the connecting rod overlap each other, the lower end of the push rod being provided with a lock operating member 124 slidable along the push rod and being spring biased towards the end of the push rod. An engaging portion 128 on the member 124 engages a hook portion 119 on the rod 4a to lock the rods 3a, 4a in the co-linear position. To permit folding of the carriage, the opposed surfaces of the connecting rod 4a and the member 124 are formed with an engaging pawl 130 and a hole 123 for fixing said member 124 relative to the rod 4a when the member 124 is slid on rod 3a towards the upper end thereof against the force of the spring, thereby disengaging the portions 119, 128 and allowing pivoting of the rear leg relative to the push rod about pivot point 16a.

FIG.18

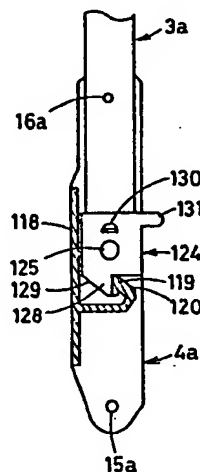


FIG.19

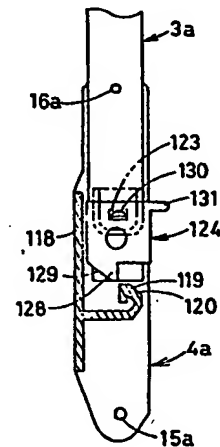
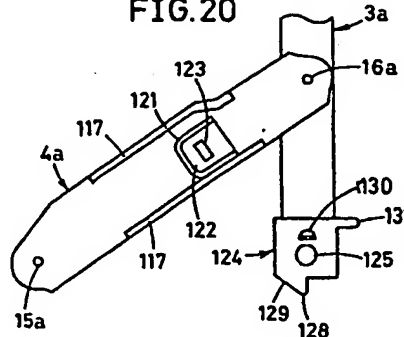


FIG.20



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FIG. 1

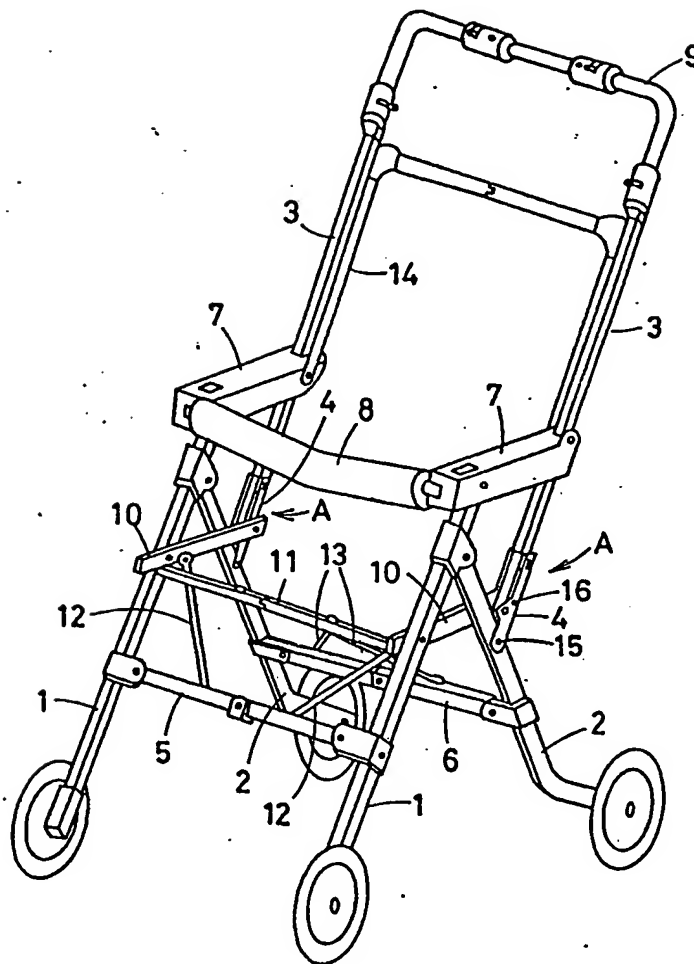


FIG. 2

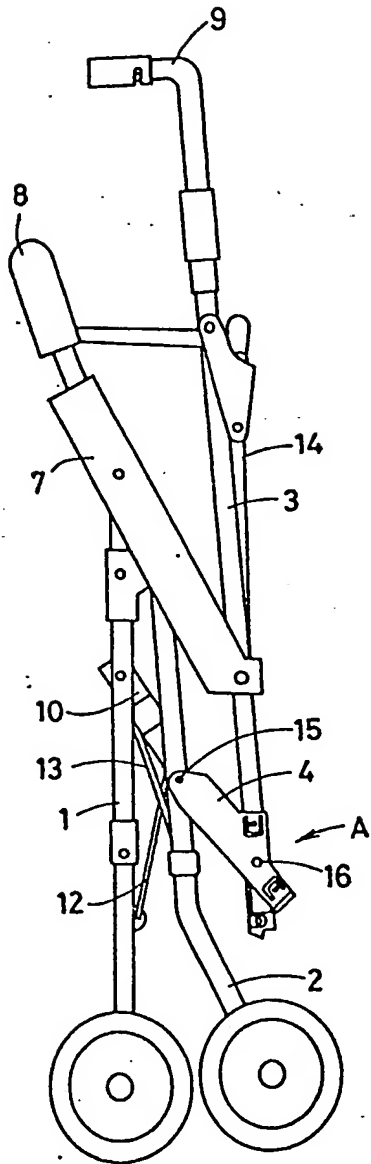


FIG. 3

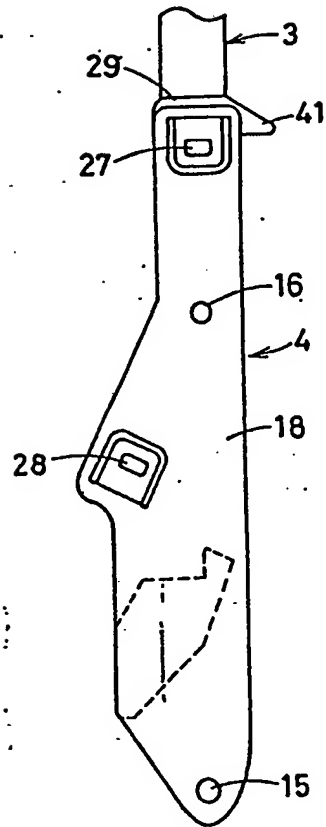


FIG. 4

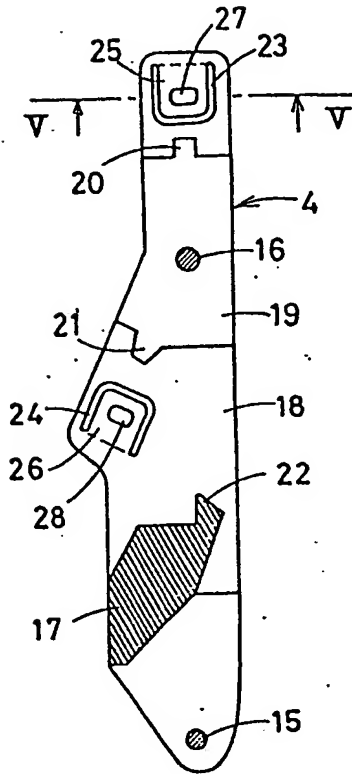


FIG. 6

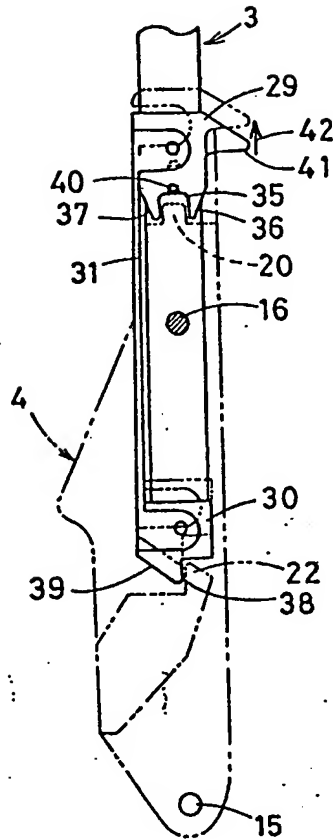


FIG. 5

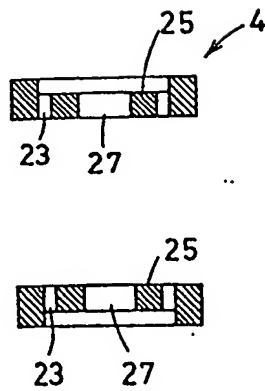


FIG. 7

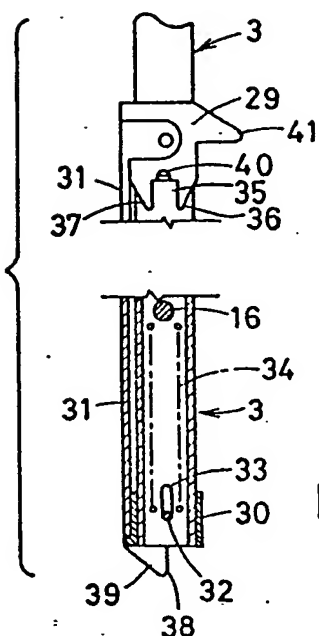


FIG. 9

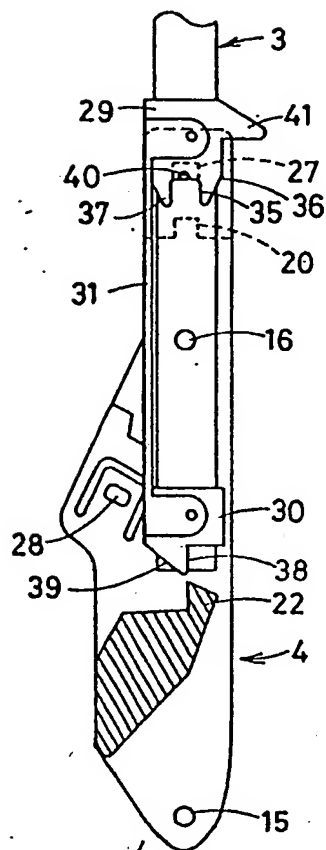


FIG. 8

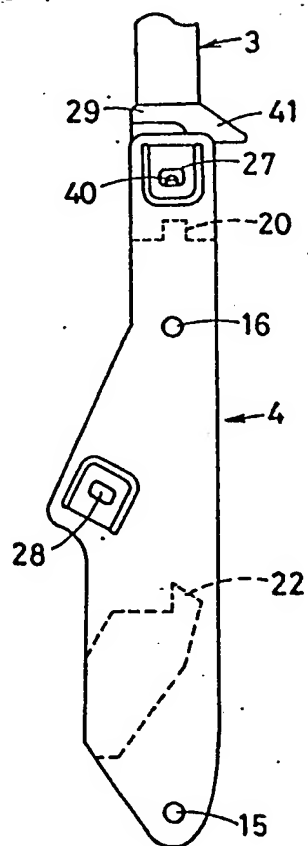


FIG. 10

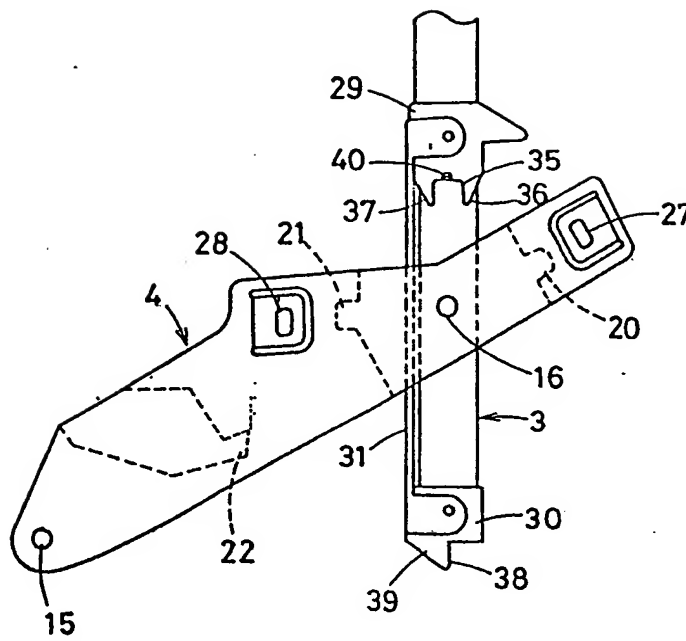


FIG. 11

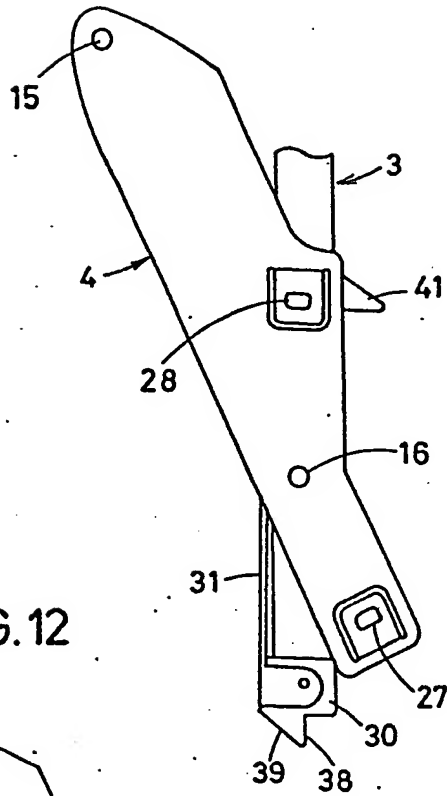


FIG. 12

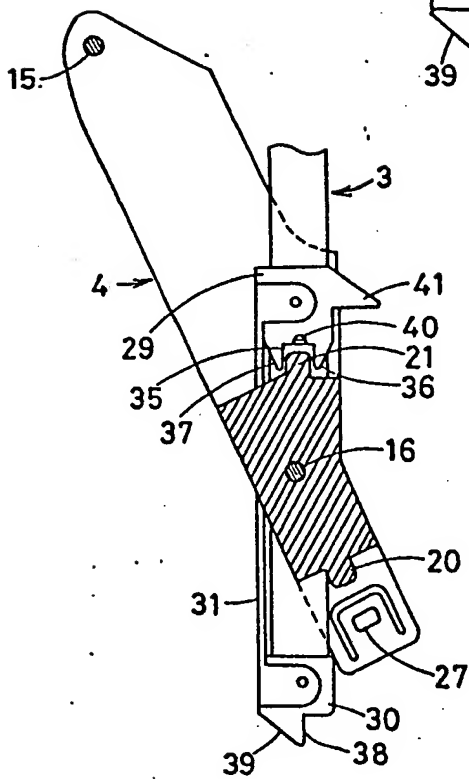


FIG. 13

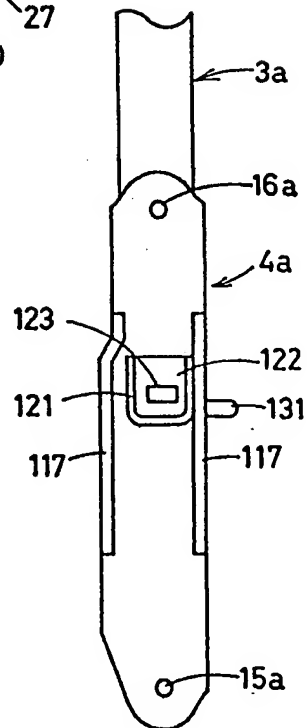


FIG.14

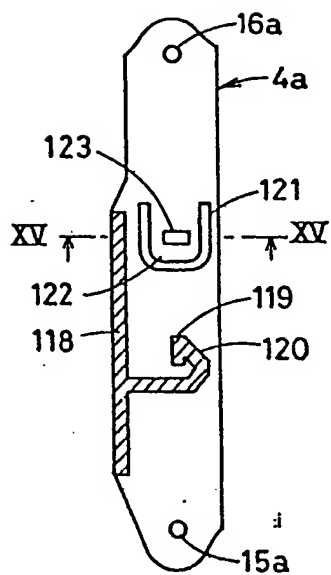


FIG.15

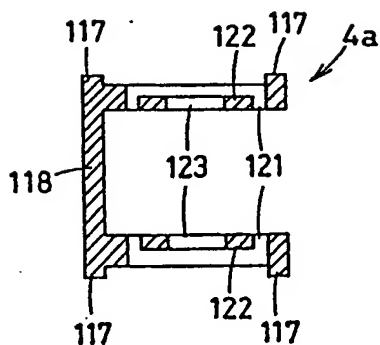


FIG.16

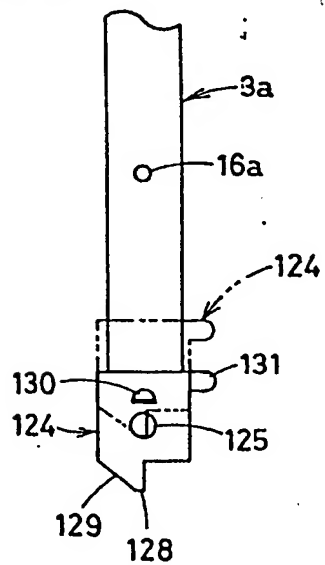
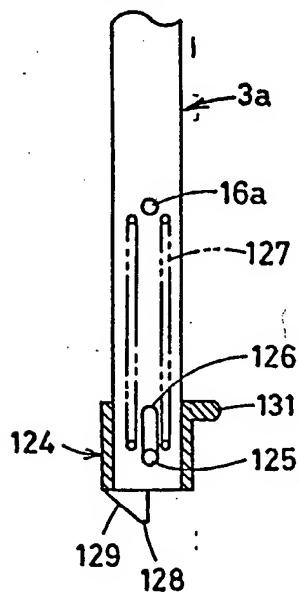


FIG.17



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FIG. 18

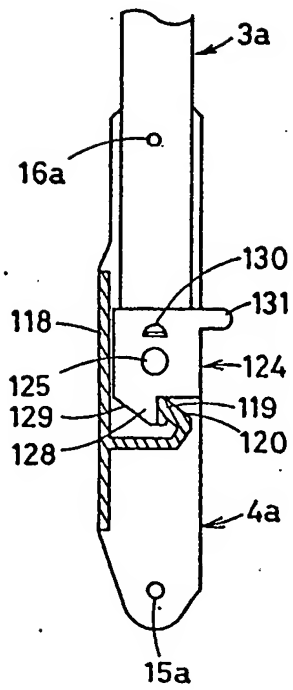


FIG. 19

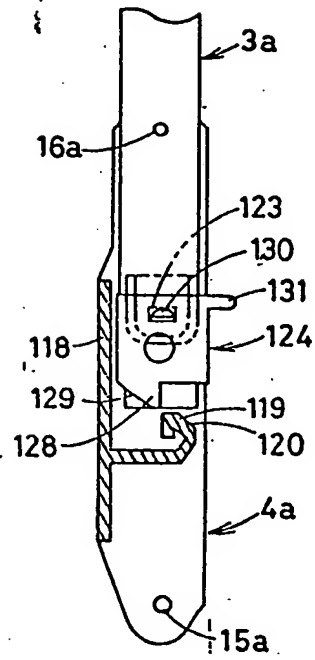


FIG. 20

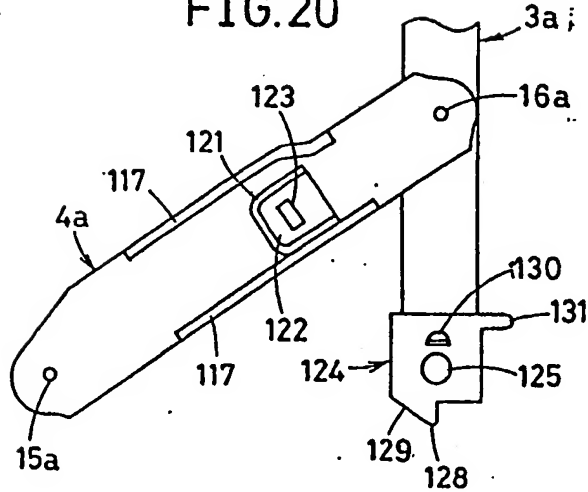
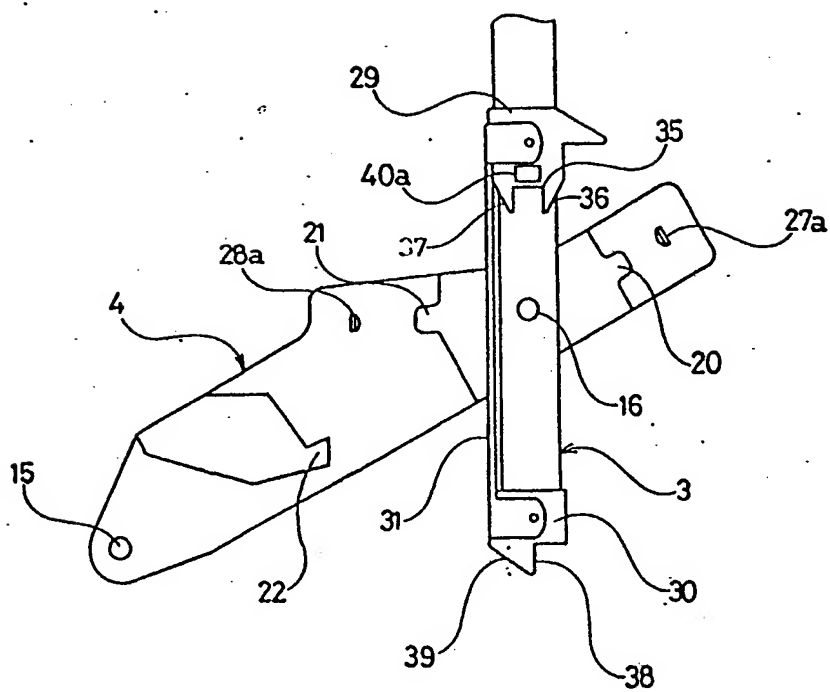


FIG. 21



SPECIFICATION

Mechanism for locking opened state of baby carriage

5

BACKGROUND OF THE INVENTION

This invention relates to a mechanism for locking the opened state or both the opened and closed states of a foldable baby carriage.

- 10 A foldable baby carriage is brought into the opened or closed state depending on circumstances. For example, the foldable baby carriage is in the opened state when moved with a baby placed therein. On the other hand,
- 15 when it is carried without a baby placed therein, it is brought into the closed state.

- The securing of the opened state of the baby carriage is important to the stabilization of its travel with a baby placed therein and to
- 20 the enhancement of safety. Further, accidental opening of the baby carriage in its closed state causes trouble to the carrying of the baby carriage in its closed state.

- Thus, a suitable locking mechanism is required to make reliable both the closed and opened states of such foldable baby carriage. Such locking mechanisms will be designed according to the respective types of baby carriages, and a foldable baby carriage to which
- 30 the locking mechanism of this invention is applied includes at least the following arrangement. It has a pair of front legs, a pair of rear legs, a pair of push rods, and a pair of connecting rods pivotally connecting, each at its
- 35 opposite ends, the respective rear legs and push rods. When the push rods and the associated connecting rods are straightened and fixed, the opened state of the baby carriage is locked, while when the push rods and the
- 40 associated connecting rods are bent and fixed, the closed state of the baby carriage is locked.

- When such foldable baby carriage is arranged so that its opened and closed states
- 45 can be locked, it is preferable from the standpoint of operability that the locking automatically take place at the end of movement from closed to opened state and at the end of movement from opened to closed state. On
- 50 the other hand, when the opened state is to be changed to the closed state and the closed state to the opened state, it is desirable from the standpoint of safety that the locked state can be canceled only after a positive human
- 55 manipulation.

SUMMARY OF THE INVENTION

- An object of this invention is to provide an opened state locking mechanism simple in
- 60 construction and superior in operability and safety, for use with a foldable baby carriage of the described type.

- Another object of this invention is to provide a mechanism for locking the opened and
- 65 closed states of a foldable baby carriage of

the described type, which is simple in construction and superior in operability and safety and which is capable of locking both the opened and closed states by using a single

70 common member.

- This invention, as described above, is applied to a foldable baby carriage having a pair of front legs, a pair of rear legs, a pair of push rods, and a pair of connecting rods turnably connecting, each at its opposite ends,
- 75 the respective rear legs and push rods. Each connecting rod is turnably connected at a first pivot point to the associated rear leg and at a second pivot point to the associated push
- 80 rod. The second pivot point for connecting the push rod to the connecting rod is positioned a predetermined distance above the lower end of the push rod. Therefore, when the push rod and the connecting rod are linearly
- 85 arranged a state which corresponds to the opened state of the baby carriage, it follows that the push rod and the connecting rod overlap each other a predetermined distance. It is in this overlapping portion that the locking
- 90 mechanism is formed. That is, the lower end of each push rod is provided with a lock operating member slidable in the direction of the length of the push rod. The lock operating member is constantly urged by a spring to
- 95 slide toward the lower end of the push rod. The lower end of the lock operating member is formed with an engaging portion following an inclined guide portion. On the other hand, each connecting rod is formed with a hook
- 100 portion following an inclined portion, said hook portion being adapted to engage said engaging portion when the lock operating member is in its lower end position. Further, in the slide movement of the lock operating
- 105 member which is effected when canceling the locking, more particularly, in the operation which is performed so that the lock operating member slides toward the upper end of the push rod against the force of the spring, the position of the lock operating member is temporarily
- 110 retained, and for this purpose, the opposed surfaces of the connecting rod and lock operating member are formed with an engaging pawl and an engaging hole which are adapted to engage each other. When such
- 115 engaging pawl and engaging hole engage each other, the lock operating member is fixed to be prevented from sliding relative to the connecting rod and in this state the engagement of said engaging portion with said hook
- 120 portion has been canceled.

- According to the invention, in the opened state of the baby carriage, the engaging portion of each lock operating member engages
- 125 the hook portion of the associated connecting rod to maintain the linearly arranged push rod and connecting rod in this state, with the spring forcing them into this engagement; thus, a reliable locked state can be obtained. Further, when it is desired to cancel such
- 130

locked state to bring the baby carriage into its opened state, the lock operating member is upwardly slid, whereupon the engaging pawl engages the engaging hole, with the result
 5 that the unlocked state is maintained; thus, there is no need for the operator to keep applying the force. Therefore, the operator is allowed to concentrate on the operation of bringing the baby carriage into its closed
 10 state. Further, when the baby carriage is to be changed from the closed to the opened state, the guide portion advantageously acts during such process to cause the engaging portion to automatically engage the hook portion, so that
 15 there is no need for a special operation for locking.

In a preferred embodiment of the invention, positioned on one end of each said connecting rod is a first pivot point for turnably connecting the associated rear leg. positioned in
 20 substantially the middle of each connecting rod is a second pivot point for turnably connecting the associated push rod. The second pivot point is located a predetermined distance above the lower end of the push rod. As a result, when the push rod and the connecting rod are in the linear state, they overlap each other said predetermined distance. Each push rod is provided, above the second
 25 pivot point, with a lock operating member slidable in the direction of the length of the push rod. Each lock operating member is constantly urged to slide toward the lower end of the associated push rod. The lower end of each lock operating member is formed with a
 30 push rod-side engaging portion. Each connecting rod is formed with an opened state locking purpose connecting rod-side engaging portion adapted to engage the push rod-side engaging portion when the lock operating member is in its lower end position and in said
 35 linear state. Further, each connecting rod is formed with another engaging portion. That is, each connecting rod is formed with a closed state locking purpose connecting rod-side engaging portion adapted to engage said push
 40 rod-side engaging portion when the lock operating member is in its lower end position and when the push rod and connecting rod are in their bent state. At least either the push rod-side engaging portion or the opened state
 45 locking purpose connecting rod-side engaging portion and closed state locking purpose connecting rod-side engaging portion are formed with inclined surfaces adapted to lead them to automatic engagement against the force of the spring when they approach each other during the opening or closing movement of the baby carriage. Further, the surface of each lock operating member opposed to the associated
 50 connecting rod is formed with temporarily engaging means, e. g., an engaging pawl. On the other hand, the surface of each connecting member opposed to the associated lock operating member is formed with opened state un-

locking purpose engaging means, such as a hole and closed state unlocking purpose engaging means, such as a hole. The opened state locking purpose engaging hole is positioned relative to said opened state locking
 70 purpose connecting rod-side engaging portion, while the closed state unlocking purpose engaging hole is positioned relative to said closed state locking purpose connecting rod-side engaging portion. When the locking operating member is slid toward the upper end of the push rod against the force of said spring, said engaging pawl engages the opened state
 75 unlocking purpose engaging hole or closed state unlocking purpose engaging hole. Thus, with the push rod-side engaging portion disengaged from the opened state locking purpose connecting rod-side engaging portion or from the closed state locking purpose connecting
 80 rod-side engaging portion, each lock operating member is temporarily fixed to be prevented from sliding relative to the associated connecting rod.

According to a preferred embodiment of this invention, in both the opened and closed states of the baby carriage, the push rod-side engaging portion of the lock operating member engages either of the two engaging portions formed on the connecting rod, so that
 90 both the opened and closed states can be locked. For example, in the opened state, the push rod-side engaging portion engages the opened state locking purpose connecting rod-side engaging portion of the connecting rod and the push rod and connecting rod which are now in the linear state are maintained in this state, with the spring forcing them into this state, so that a reliable locked state can be obtained. Further, in the closed state, the
 95 push rod-side engaging portion engages the closed state locking purpose connecting rod-side engaging portion and the push rod and connecting rod which are now in the bent state are maintained in this state, with the spring ensuring a reliable locking state.

When it is desired to cancel these locked states, this can be attained by upwardly sliding each lock operating member. If the baby carriage is in the opened state, this operation
 100 allows the engaging pawl of the lock operating member to engage the opened state unlocking purpose engaging hole to temporarily maintain the unlocked state, so that there is no need for the operator to keep applying the force against the force of the spring. On the other hand, when it is desired to unlock the closed state, the lock operating member is upwardly slid, whereupon the engaging pawl engages the closed state unlocking purpose
 105 engaging hole, thereby maintaining the state in which the closed state is unlocked. As a result, the operator is allowed to concentrate on changing the baby carriage from the opened to the closed state or from the closed to the opened state. Further, when the baby carriage

is changed from the closed to the opened state and from the opened to the closed state, since in the course of these operations the inclined surfaces lead the push rod-side engaging portion and the connecting rod-side engaging portion into automatic engagement with each other, there is no special operation for locking.

These objects and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing the opened state of a baby carriage having an embodiment of this invention applied thereto;

Fig. 2 is a right-hand side view showing the closed state of the baby carriage of Fig. 1;

Fig. 3 is a view of the portion A of Fig. 1 showing a connecting portion between a push rod 3 and a connecting rod 4, the view corresponding to the opened state of the baby carriage;

Fig. 4 is a longitudinal section of the connecting rod of Fig. 3;

Fig. 5 is a section of the connecting rod 4 taken along the line V-V of Fig. 4;

Fig. 6 shows the lower end portion of the push rod 3;

Fig. 7 shows, partly in section, the lower end portion of the push rod 3;

Fig. 8 shows the unlocked state in the opened state of the baby carriage;

Fig. 9 shows the state of Fig. 8 partly in section;

Fig. 10 shows an intermediate state between the opened and closed states of the baby carriage;

Fig. 11 shows the locked state in the closed state of the baby carriage;

Fig. 12 shows the state of Fig. 11 partly in section;

Fig. 13 is a view of another embodiment of this invention, showing a connecting portion between a push rod 3a and a connecting rod 4a, the view corresponding to the opened state of the baby carriage;

Fig. 14 is a longitudinal section of the connecting rod 4a of Fig. 13;

Fig. 15 is a section taken along the line XV-XV of Fig. 14;

Fig. 16 shows the lower end portion of the push rod 3a;

Fig. 17 shows the lower end portion of the push rod 3a, with a lock operating member 124 shown in section;

Fig. 18 shows the locked state in the opened state of the baby carriage;

Fig. 19 shows the unlocked state in the opened state of the baby carriage;

Fig. 20 shows an intermediate state between the opened and closed states of the

baby carriage; and

Fig. 21 is a view of a modification of the first embodiment, showing a connecting portion between a push rod 3 and a connecting rod 4, the view corresponding to the state shown in Fig. 10.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 is a perspective view showing the opened state of a baby carriage having an embodiment of this invention applied thereto. Fig. 2 is a right-hand side view showing the closed state of the baby carriage.

A baby carriage opened and closed state locking mechanism according to an embodiment of this invention is attached to the baby carriage so as to lock both the opened state of Fig. 1 and the closed state of Fig. 2. The place of attachment is shown at A in Figs. 1 and 2. Since an understanding of such locking mechanism necessitates a beforehand understanding of the arrangement of the baby carriage itself, the overall structure of the baby carriage will first be described.

Baby carriages of this type are disclosed in my pending U.S. Patent Application Serial No. 549,253 "Mechanism for Determining Width Between Pusher Rods of Baby Carriage" and also U.S. Patent Application Serial No. 549,270 "Mechanism for Locking Opened State of Baby Carriage".

This baby carriage has a pair of front legs 1, a pair of rear legs 2, and a pair of connecting rods 4. The connecting rods 4 serve to connect, each at its opposite ends, the respective rear legs 2 and push rods 3.

As for another arrangement of the illustrated baby carriage, a foldable front leg connecting member 5 is connected at its opposite ends between the front legs 1 so that it is turnable relative to the front legs 1. Further, a foldable rear leg connecting member 6 is connected at its opposite ends between the rear legs 2 so that it is turnable relative to the rear legs 2. The rear legs 2 are turnably connected at their upper ends to the front legs 1. Handrails 7 are turnably connected at their front ends to the upper ends of the front legs 1 and at their rear ends to the push rods 3. A foldable torso guard 8 is turnably connected at its opposite ends between the handrails 7 so that it is turnable relative to the handrails 7. A foldable grip 9 is connected at its opposite ends between the upper ends of the push rods 3 so that it is turnable relative to the push rods 3. Longitudinal connecting members 10 are turnably connected at their front ends to the front legs 1 and at their rear ends to the connecting rods 4. A seat support member 11 which is foldable is connected at its opposite ends between the longitudinal connecting members 10 so that it is turnable relative to the longitudinal connecting members 10. Operatively connecting rods 12 are connected be-

tween the front leg connecting member 5 and the longitudinal connecting members 10 so that in the folding operation the movement of the longitudinal connecting members 10 is operatively associated with the folding of the front leg-connecting member 5. Further, operatively connecting rods 13 are connected between the rear leg connecting member 6 and the seat support member 11, whereby in the folding operation the folding of the rear leg connecting member 6 and the folding of the seat support member 11 are operatively associated with each other.

In addition, though not shown, the seat in the seat section of this baby carriage is formed between the longitudinal connecting members 10 and supported by the seat support member 11. The backrest of the seat section is held by a backrest holding member 14:

In such foldable baby carriage, when the opened state is changed to the closed state, the width dimension of the baby carriage is reduced, attended by the folding of the front leg connecting member 5, rear leg connecting member 6, torso guard 8, grip 9, and seat support member 11 while, as shown in Fig. 2, the front legs 1, rear legs 2, and push rods 3 are positioned substantially parallel to each other. In such folding movement, if attention is given to the movement of the portion A, it is seen that in the opened state, the push rods 3 and the respective connecting rods 4 are linearly arranged. And in the closed state, this linear state is upset and the push rods 3 and the connecting rods 4 are mutually bent, for example, arranged in V-form.

In other words, when the opened state of the baby carriage is to be changed to the closed state, at least the linear state of the push rod 3 and connecting rods 4 must be upset. Stated differently, so long as the linear state of the push rods 3 and connection rod 4 is maintained, the baby carriage will not change to the closed state. Further, when the closed state is to be changed to the opened state, at least the disposition of the push rod 3 and connecting rod 4 which are now in the bent state must be upset. Therefore, in the closed state it follows that so far as the bent state of the push rod 3 and connecting rod 4 is maintained, the baby carriage will not change to the opened state.

Based on such principle, the embodiment of this invention provides a locking mechanism whereby in the opened state of the baby carriage the linear state of the push rod 3 and connecting rod 4 is locked and in the closed state of the baby carriage the bent state of the push rod 3 and connecting rod 4 is locked.

The particulars of the locking mechanism will now be described with reference to Figs. 3 through 12.

As is clear from the attitudes of the push

rods 3 and connecting rods 4 shown in Figs. 1 and 2, they change with the opening and closing movements of the baby carriage. However, in the locking mechanism to be described herein, the relative positional relation between the push rod 3 and the connecting rod 4 becomes a problem. For a clear understanding of such relative positional relation between the push rod 3 and the connecting rod 4, in Figs. 3 et seq. the attitude of the push rod 3 is fixed so that it extends vertically, and the connecting rod 4 is shown in such relation with the push rod 3.

Fig. 3 is an external view showing the state in which the push rod 3 and connecting rod 4 are connected, the view corresponding to the opened state of the baby carriage. Positioned at the lower end of the connecting rod 4 is a first pivot pin 15 serving as a first pivot point for turnably connecting the rear leg 2. Positioned substantially in the middle of the connecting rod 4 is a second pivot pin 16 serving as a second pivot point for turnably connecting the push rod 3.

In Fig. 4, the connecting rod 4 alone is shown in longitudinal section, and in Fig. 5 a section taken along the line V—V of Fig. 4 is shown. As is clear from these figures, the connecting rod 4 has two parallel plates 18 spaced apart from each other by a spacer 17. Therefore, the push rod 3 shown in Fig. 3 is disposed between these two plates 18. The plates 18 are of symmetrical shape with respect to each other. Thus, there are a plate 18 appearing in Fig. 3 and a plate 18 appearing in Fig. 4, but the shape appearing on the plate 18 of Fig. 4 is also applied to the other plate 18.

The inner surface of each plate 18 of the connecting rod 4 is formed with a raised portion 19 which provides an opened state locking purpose connecting rod-side engaging portion 20 and a closed state locking purpose connecting rod-side engaging portion 21. Further, the aforesaid spacer 17 is formed with a connecting rod-side auxiliary engaging portion 22. The connecting rod 4 is formed with two tongues 25 and 26 surrounded by U-shaped cuts 23 and 24. The tongues 25 and 26, as shown in Fig. 5 depicting the tongue 25, are thinner than the other portion. The tongues 25 and 26 are formed with an opened state unlocking purpose engaging hole 27 and a closed state unlocking purpose engaging hole 28, respectively.

Fig. 6 shows the lower end portion of the push rod 3. The lower end portion of the push rod 3 is provided with a lock operating member 29 and an auxiliary lock member 30 which are slidable in the direction of the length of the push rod 3. The lock operating member 29 and auxiliary lock member 30 are connected together by a connecting plate 31 so that they move in the same direction.

In Fig. 7, part of the push rod 3 and the

auxiliary lock member 30 are shown in section to clarify the relation between the lock operating member 29 and auxiliary lock member 30 and the push rod 3. The auxiliary lock member 30 has a guide pin 32 attached thereto which extends through the push rod 3. The guide pin 32 is received in an elongated guide hole 33 formed in the push rod 3 to extend lengthwise of the push rod 3. Thus, the auxiliary lock member 30 is capable of sliding on the push rod 3 within the range in which the guide pin 32 can be moved in the elongated guide hole 33. The range of slide of the auxiliary lock member 30 is also the range of slide of the lock operating member 29. The push rod 3 is fabricated, e.g., of a pipe and houses a coiled compression spring 34. The compression spring 34 abuts at its ends against the second pivot pin 16 and the guide pin 32 to urge the auxiliary lock member 30 and hence the lock operating member 29 to slide toward the lower end of the push rod 3.

The lower end of the lock operating member 29 is formed with a push rod-side engaging portion 35 positioned between a pair of inclined surface 36 and 37, said portion 35 being paired, for engagement, with the aforesaid opened state locking purpose connecting rod-side engaging portion 20 and with the closed state locking purpose connecting rod-side engaging portion 21. The lower end of the auxiliary lock member 30 is formed with a push rod-side auxiliary engaging portion 38 following an inclined guide portion 39, said portion 38 being paired, for engagement, with the aforesaid connecting rod-side engaging portion 22.

Further, the surfaces of the lock operating member 29 opposed to the connecting rod 4, that is, the forward and backward surfaces thereof in Figs. 6 and 7, are formed with engaging pawls 40. Such engaging pawl 40 will engage the opened state unlocking purpose engaging hole 27 or the closed state unlocking purpose engaging hole 28 formed in said connecting rod 4. In addition, the lock operating member 29 is provided with an operating portion 41 projecting therefrom which, as shown in Fig. 3, even when the lower end portion of the push rod 3 is received in the connecting rod 4, projects beyond the connecting rod 4 to facilitate operation from the outside.

The operation method and movement of the locking mechanism obtained by the aforesaid push rod 3, connecting rod 4, lock operating member 29 and auxiliary lock member 30 will now be described.

Figs. 3, 6 and 7 show the baby carriage locked in its opened state. The lock operating member 29 and auxiliary lock member 30 are downwardly slid by the compression spring 34, while the push rod-side engaging portion 35 and push rod-side auxiliary engaging portion 20 are engaged with the opened state

locking purpose connecting rod-side engaging portion 20 and connecting rod-side auxiliary engaging portion 22, respectively. Therefore, the push rod 3 and connecting rod 4, in this state, cannot be turned in either direction around the second pivot pin 16. That is, the push rod 3 and connecting rod 4 are locked in the linear state.

If said lock is canceled, the baby carriage is allowed to change from opened to closed state. To effect such unlocking, the operator pulls up the lock operating member 41 by the finger in the direction of arrow 42 against the force of the compression spring 34. In response to this pull-up, each pawl 40, as shown in Figs. 8 and 9, engages the opened state unlocking purpose engaging hole 27, whereby the lock operating member 29 and auxiliary lock member 30 are temporarily maintained in this state in spite of the action of the compression spring 34. When the engaging pawl 40 engages the opened state unlocking purpose engaging hole 27, the push rod-side engaging portion 35 of the lock operating member 29 is disengaged from the opened state locking purpose connecting rod-side engaging portion 20, while the push rod-side auxiliary engaging portion 38 of the auxiliary lock member 30 is disengaged from the connecting rod-side auxiliary engaging portion 22. Therefore, the connecting rod 4 is now allowed to turn around the second pivot pin 16 relative to the push rod 3. This turning movement allows relative movement of the push rod 3 and connecting rod 4 in the course of change from the opened to the closed state of the baby carriage as described above.

Fig. 10 shows an intermediate state with the connecting rod turned clockwise around the second pivot pin 16, the baby carriage changing from opened to closed state. During the change from the state of Figs. 8 and 9 to the state of Fig. 10, the engaging pawl 40 escapes from the opened state unlocking purpose engaging hole 27. Upon completion of this escape, the lock operating member 29 and auxiliary lock member 30 are moved toward the lower end of the push rod 3 by the action of the spring 34.

As the state of Fig. 10 further progresses, the baby carriage comes close to completing its change to the closed state, whereupon the closed state locking purpose connecting rod-side engaging portion 21 contacts the inclined surface 37 of the lock operating member 29. In this contacted state, with the closed state locking purpose connecting rod-side engaging portion 21 and the inclined surface 37 sliding along each other, the lock operating member 29 and the auxiliary lock member 30 are slid on the push rod 3 against the force of the compression spring 34. When the closed state locking purpose connecting rod-side engaging portion 21 reaches the end of the inclined surface 37, the lock operating member

29 and auxiliary lock member 30 are downwardly slid by the action of the compression spring 34, establishing the state in which the push rod-side engaging portion 35 engages the closed state locking purpose connecting rod-side engaging portion 21. This state is shown in Figs. 11 and 12 and corresponds to the state in which the baby carriage is locked in its closed state.

In the state shown in Figs. 11 and 12, the push rod 3 and the connecting rod 4 are prevented from turning around the second pivot pin 16 relative to each other. That is, the push rod 3 and the connecting rod 4 are locked in the bent state.

To change the baby carriage from closed to opened state, the aforesaid lock must be canceled. To effect such unlocking, the operator fingers the operating portion 41 to pull up the lock operating member 29 and auxiliary lock member 30 against the force of the compression spring 34. In response thereto, the engaging pawl 40 engages the closed state unlocking purpose engaging hole 28 in an unlustrated manner, whereby the lock operating member 29 and auxiliary lock member 30 are temporarily maintained in this state in spite of the action of the compression spring 34. At this time, the push rod-side engaging portion 35 is in the state disengaged from the closed state locking purpose connecting rod-side engaging portion 21. Therefore, the connecting rod 4 is allowed to turn counterclockwise around the second pivot pin 16 relative to the push rod 3. This turning allows the relative movement of the push rod 3 and connecting rod 4 in the course of change of the baby carriage from closed to opened state as described above.

In response to the aforesaid counterclockwise turning of the connecting rod 4, the state shown in Fig. 10 is reestablished, and as the turning further progresses, the inclined surface 36 of the lock operating member 29 contacts the opened state locking purpose connecting rod-side engaging portion 20 of the connecting rod 4 while the guide portion 39 of the auxiliary lock member 30 contacts the connecting rod-side auxiliary engaging portion 22 of the connecting rod 4. In this contacted state, the lock operating member 29 and auxiliary lock member 30 are slid on the push rod 3 against the force of the compression spring 34. When the opened state locking purpose connecting rod-side engaging portion 20 reaches the end of the inclined surface 36 and the connecting rod-side auxiliary engaging portion 22 reaches the end of the guide portion 39, the lock operating member 29 and auxiliary lock member 30 are downwardly slid by the action of the compression spring 34, whereby the push rod-side engaging portion 35 engages the opened state locking purpose connecting rod-side engaging portion 20 while the push rod-side auxiliary en-

gaging portion 38 engages the connecting rod-side auxiliary engaging portion 22. That is, also at the end of the change of the baby carriage from closed to opened state, a locked state is automatically obtained.

The invention has so far been described with reference to the illustrated embodiment, but modifications thereof are possible.

For example, while the illustrated embodiment is provided with the auxiliary lock member 30 connected to the lock operating member 29 through the connecting plate 31 and with the connecting rod-side engaging portion 22 associated therewith, this provision is made purely for auxiliary purposes and even in the opened state a sufficient locked state can be obtained so long as the push rod-side engaging portion 35 of the lock operating member 29 and the opened state locking purpose connecting rod-side engaging portion 20 of the connecting rod 4 are present. Therefore, even if the auxiliary lock member 30 and the connecting rod-side engaging portion 22 are absent, the mechanism functions sufficiently.

Further, while the connecting rod 4 has been composed of two plates 18, it may be composed of a single plate.

Further, while the inclined surfaces 36 and 37 enabling automatic engagement have been provided in connection with the push rod-side engaging portion 35, such inclined surfaces may be provided on the opened state locking purpose connecting rod-side engaging portion 20 and the closed state locking purpose connecting rod-side engaging portion 21 or they may be provided on both of them.

Further, in the illustrated embodiment, the opened state unlocking purpose engaging hole 27 and closed state unlocking purpose engaging hole 28 have been positioned on the thin tongues 25 and 26. While this arrangement allows smooth engagement of the engaging pawl 40 with the engaging holes 27 and 28, if such advantage is not desired, there is not need to pay such heed to the engaging holes.

Further, in the above described embodiment, although the engaging holes 27 and 28 have been formed in the connecting rod 4 and the engaging pawls 40 have been formed on the lock operating member 29, reversely, as shown in Fig. 21, the engaging holes 40a may be formed in the lock operating member 29 and the engaging pawls 27a and 28a on the connecting rod 4. In Fig. 21, the parts which are the same as those shown in Fig. 10 are given the same reference numerals.

An embodiment to be presently described is designed to lock the baby carriage only in its opened state. Thus, the construction is correspondingly simpler than in the preceding embodiment.

Figs. 13 through 20 show this second embodiment. In these figures, the parts which are the same as or correspond to those shown in Figs. 1 through 12 described above are given

the same reference numerals with the letter "a" suffixed to each numeral.

Fig. 13 is an external view showing the state of connection between a push rod 3a and a connecting rod 4a, the view corresponding to the opened state of the baby carriage. Positioned on the opposite ends of the connecting rod 4a are a first pivot pin 15a serving as a first pivot point for turnably connecting the rear leg 2 and a second pivot pin 16a serving as a second pivot point for turnably connecting the push rod 3a. The surface of the connecting rod 4a is formed with ribs 117 extending along the end edges to reinforce the connecting rod 4a.

In Fig. 14, the connecting rod 4a alone is shown in longitudinal section, and in Fig. 15, a section taken along the line XV—XV of Fig. 14 is shown. As is clear from these figures, the connecting rod 4a has a U-shaped cross-section connected by end walls 118. Extending integrally from the end wall 118, a hook portion 119 is formed. The hook portion 119 extends from an inclined guide portion 120. The connecting rod 4a is formed with tongues 122 each surrounded by an U-shaped cut 121, each said tongue 122 being thinner than the other portion, as shown in Fig. 15. Each tongue 22 is formed with an engaging hole 123.

In Fig. 16, the lower end portion of the push rod 3a alone is shown. The lower end portion of the push rod 3a is provided with a lock operating member 124 slidable in the direction of the length of the push rod 3a. In Fig. 17, the lock operating member 124 is shown in section to clarify the relation between the lock operating member 124 and the push rod 3a. Attached to the lock operating member 124 is a guide pin 125 extending through the push rod 3a, said guide pin 125 being received in an elongated guide hole 126 formed in the push rod 3a to extend in the direction of the length of the push rod 3a. Therefore, the lock operating member 124 is allowed to slide on the push rod 3a in the range in which the guide pin 125 can be moved in the elongated guide hole 126. The push rod 3a is fabricated, e.g., of a pipe, with a coiled compression spring 127 housed therein. The compression spring 127 abuts at its opposite ends against the second pivot pin 16a and guide pin 125, thereby constantly urging the lock operating member 124 toward the lower end of the push rod 3a. The lower end of the lock operating member 124 is formed with an engaging portion 128 paired, for engagement, with the hook portion 119 of the aforesaid connecting rod 4a and extending from an inclined guide portion 129. Further, the surfaces of the lock operating member 124 opposed to the connecting rod 4a, that is, the forward and backward surfaces thereof in Fig. 16, are formed with engaging pawls 130. The engaging pawls 130 are adapted to engage

the aforesaid engaging holes 123 of the connecting rod 4a. In addition, the lock operating member 124 is formed with an operating portion 131 projecting therefrom so that even when the lower portion of the push rod 3a is received in the connecting rod 4a, the operating member projects beyond the connecting rod 4a to facilitate operation from the outside.

The operating method and movement of the locking mechanism obtained by the aforesaid push rod 3a, connecting rod 4a, and lock operating member 124 will now be described.

Fig. 18 shows the opened state of the baby carriage corresponding to Fig. 13, the connecting rod 4a being shown with its front wall removed. The lock operating member 124 is urged by the compression spring 127 (Fig. 17) to slide downward and the engaging portion 128 is engaged with the hook portion 119, preventing the push rod 3a and connecting rod 4a from turning in either direction relative to each other. That is, the push rod 3a and connecting rod 4a are locked in the linear state.

If the above lock is canceled, the baby carriage is allowed to change from opened to closed state. To effect such unlocking, the operator fingers the operating portion 131 to push up the lock operating member 124 against the force of the spring 127 (Fig. 17), as shown in Fig. 19. When the engaging pawls 30 engage the engaging holes 123, the lock operating member 124 is temporarily maintained in this state in spite of the action of the spring 127. When the engaging pawls 30 engage the engaging holes 128, the engaging portion 128 of the lock operating member 124 is disengaged from the hook portion 119. Thus, the connecting rod 4a is now allowed to turn clockwise around the second pivot pin 16a relative to the push rod 3a. This turning allows the relative movement of the push rod 3a and connecting rod 4a in the course of the change from the opened to the closed state of the baby carriage as described above.

Fig. 20 shows an intermediate state with the connecting rod 4a turned clockwise around the second pivot pin 16a, the baby carriage changing to its closed state. During the change from the state of Fig. 19 to the state of Fig. 20, the engaging pawls 130 escape from the engaging holes 123. Upon completion of such escape, the lock operating member 124 is moved to the lower end of the push rod 3a by the action of the compression spring 27.

If Fig. 20 shows an intermediate state assumed by the baby carriage when changing from closed to opened state, then during change from the state of Fig. 20 to the state of Fig. 18 there is obtained a state in which the guide portion 129 of the lock operating member 124 contacts the guide portion 120 of the connecting rod 4a. In this contacted

state, the two guide portions 129 and 120, while sliding along each other, cause the lock operating member 124 to slide on the push rod 3a against the force of the compression spring 127. When the contact between the guide portions 129 and 120 is about to end, the lock operating member 124 is downwardly moved by the action of the compression spring 127, establishing a state in which the engaging portion 128 engages the hook portion 119. That is, at the end of the course of change from the closed to the opened state of the baby carriage, the locked state is automatically established.

The second embodiment described above may be modified as follows.

In the illustrated embodiment, the connecting rod 4a is of U-shaped cross-section adapted to receive the lock operating member 124 and the lower end of the push rod 3a, but the connecting rod may be a simple plate-like member.

Further, while the engaging holes 123 have been formed in the connecting rod 4a and the engaging pawls 130 have been formed on the lock operating member 124, reversely the engaging holes may be formed in the lock operating member and the engaging pawls on the connecting rod.

Further, in the illustrated embodiment, the engaging holes 123 are positioned in the tongues 122 of thin wall, while this arrangement allows smooth engagement of the engaging pawls 133 with the engaging holes 123, if such advantage is not desired, there is not need to pay such heed to the engaging holes.

Although the present invention has been described and illustrated in detail, it is clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the scope of the present invention being limited only by the terms of the appended claims.

CLAIMS

1. A mechanism for locking the opened state of a foldable baby carriage having a pair of front legs, a pair of rear legs, a pair of push rods, and a pair of connecting rods for turnably connecting, each at its opposite ends, the respective rear legs and push rods, wherein when said push rods and said connecting rods associated therewith are brought into their linear state and locked, the opened state of the baby carriage is locked, while the closed state of the baby carriage is obtained involving the movement of said push rods and said connecting rods associated therewith being brought into the bent state, said locking mechanism being characterized in that:

the opposite ends of each of said connecting rods have positioned thereon first and second pivot points for turnably connecting each said rear leg and each said push rod,

the second pivot pin for connecting said

push rod is positioned a predetermined distance above the lower end of the push rod, whereby in said linear state, said push rod and said connecting rod overlap each other along said predetermined distance,

the lower end of each said push rod is provided with a lock operating member so that it is slidable in the direction of the push rod, said lock operating member being constantly urged by a spring to slide toward the lower end of the push rod, the lower end of the lock operating member being formed with an engaging portion extending from an inclined guide portion,

each said connecting rod is formed with a hook portion extending from said guide portion and adapted to engage said engaging portion, and

the opposed surfaces of each said connecting rod and each said lock operating member are formed with an engaging pawl and an engaging hole, in a pair, for fixing said lock operating member from sliding relative to said connecting rod when said locking member is slid on said push rod toward the upper end of the push rod against the force of said spring to cancel the engagement with said hook portion of said engaging portion.

2. A mechanism for locking the opened state of a baby carriage as set forth in Claim 1, wherein said connecting rod is of U-shaped cross-section adapted to receive therein said lock operating member and the lower end of said push rod when said linear state is established.

3. A mechanism for locking the opened state of a baby carriage as set forth in Claim 1, wherein said engaging hole is formed in said connecting rod, while said engaging pawl is formed on said lock operating member.

4. A mechanism for locking the opened state of a baby carriage as set forth in Claim 3, wherein said engaging hole is positioned in a thin tongue formed in a portion of said connecting rod.

5. A baby carriage substantially as herein particularly described with reference to and as illustrated in the accompanying drawings.